

## WHAT IS CLAIMED IS:

1. A coding device comprising:

coding means for coding an external input signal in a macroblock unit;

first storing means for storing a code output from said coding means;

5 second storing means for storing an output from said first storing means; and

code volume control means for controlling transfer of said code stored in said first storing means to said second storing means based on a code volume of said code obtained by said coding means such that a length of a video packet constituted by said code is a predetermined length or less.

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2. The coding device according to claim 1, wherein

said code volume control means controls storage of a stuffing in said second storing means based on a minimum code volume obtained for each unit image constituted by a video packet which is required for coding said unit image.

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3. The coding device according to claim 2, wherein

said code volume control means determines a minimum code volume  $T_{min}$  to satisfy a following equation:

$$T_{min} \geq 2 \cdot R_p - B$$

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$$R_p = R / F$$

wherein a bit count read from said second storing means in a unit image is represented by  $R_p$ , an occupancy in said second storing means is represented by  $B$ , a bit rate read from said second storing means is represented by  $R$ , and a rate of a unit image to be coded is represented by  $F$ .

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4. The coding device according to claim 3, wherein  
said bit rate R read from said second storing means is variable.

5. The coding device according to claim 2, wherein  
said code volume control means determines a minimum code volume Tmin to  
satisfy a following equation:

$$T_{min} \geq v_{bv\_bits} + 2 \cdot R_p - v_{bv\_bs}$$

$$R_p = R / F$$

wherein a bit count read from said second storing means in a unit image is represented by  
10 Rp, an occupancy of a VBV buffer in a last unit image is represented by v<sub>bv\_bits</sub>, a size  
of said VBV buffer is represented by v<sub>bv\_bs</sub>, a bit rate read from said second storing  
means is represented by R, and a rate of a unit image to be coded is represented by F.

15 6. The coding device according to claim 5, wherein  
said bit rate R read from said second storing means is variable.

7. The coding device according to claim 2, wherein  
said code volume control means determines a minimum code volume Tmin  
based on a following equation or a value having a result equivalent to a result of said  
20 equation:

$$T_{min} = \max (2 \cdot R_p - B, v_{bv\_bits} + 2 \cdot R_p - v_{bv\_bs})$$

$$R_p = R / F$$

wherein a bit count read from said second storing means in a unit image is represented by  
Rp, an occupancy in said second storing means is represented by B, an occupancy of a  
25 VBV buffer in a last unit image is represented by v<sub>bv\_bits</sub>, a size of said VBV buffer is

represented by vbv\_bs, a bit rate read from said second storing means is represented by R, and a rate of a unit image to be coded is represented by F.

8. The coding device according to claim 7, wherein said bit rate R read from  
5 said second storing means is variable.

9. The coding device according to claim 2, wherein  
said code volume control means inserts a stuffing into a video packet until a  
first relationship is not satisfied, when a present code volume of a unit image including a  
10 last coded macroblock constituting said unit image is smaller than said minimum code  
volume Tmin of said unit image and a number M of macroblocks to be coded  
subsequently to said last coded macroblock, a predetermined length VPlen of said video  
packet, said minimum code volume Tmin and said present code volume Sc have said first  
relationship:

$$15 \quad M \cdot VPlen < Tmin - Sc,$$

said code volume control means constitutes a video packet next to said video  
packet by a macroblock next to said last coded macroblock without inserting a stuffing  
into said video packet, when said first relationship is not established and said number M  
of macroblocks, said length VPlen of a video packet, said minimum code volume Tmin  
20 and said present code volume Sc have a second relationship:

$$(M - 1) \cdot VPlen < Tmin - Sc.$$

10. A coding method comprising the steps of:  
(a) coding an external input signal in a macroblock unit;  
25 (b) storing a code obtained at said step (a);

(c) controlling an output of said code stored at said step (b) such that a length of a video packet constituted by said code obtained at said step (a) is a predetermined length or less based on a code volume of said code; and  
 (d) storing said output controlled by said step (c).

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11. The coding method according to claim 10, wherein  
 said step (c) serves to control storage of a stuffing at said step (d) based on a minimum code volume obtained for each unit image constituted by a video packet which is required for coding said unit image.

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12. The coding method according to claim 11, wherein  
 said step (c) serves to determine a minimum code volume  $T_{min}$  to satisfy a following equation:

$$T_{min} \geq 2 \cdot R_p - B$$

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$$R_p = R / F$$

wherein a bit count read by said step (d) in a unit image is represented by  $R_p$ , an occupancy in said step (d) is represented by  $B$ , a bit rate read by said step (d) is represented by  $R$ , and a rate of a unit image to be coded is represented by  $F$ .

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13. The coding method according to claim 12, wherein

said bit rate  $R$  at which a code stored at said step (d) is read is variable.

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14. The coding method according to claim 11, wherein

said step (c) serves to determine a minimum code volume  $T_{min}$  to satisfy a following equation:

$$T_{min} \geq vbv\_bits + 2 \cdot R_p - vbv\_bs$$

$$R_p = R / F$$

wherein a bit count read by said step (d) in a unit image is represented by  $R_p$ , an occupancy of a VBV buffer in a last unit image is represented by  $vbv\_bits$ , a size of said  
5 VBV buffer is represented by  $vbv\_bs$ , a bit rate read by said step (d) is represented by  $R$ , and a rate of a unit image to be coded is represented by  $F$ .

15. The coding method according to claim 14, wherein

said bit rate  $R$  at which a code stored at said step (d) is read is variable.

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16. The coding method according to claim 11, wherein

said step (c) determines a minimum code volume  $T_{min}$  based on a following equation or a value having a result equivalent to a result of said equation:

$$T_{min} = \max(2 \cdot R_p - B, vbv\_bits + 2 \cdot R_p - vbv\_bs)$$

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$$R_p = R / F$$

wherein a bit count read by said step (d) in a unit image is represented by  $R_p$ , an occupancy in said step (d) is represented by  $B$ , an occupancy of a VBV buffer in a last unit image is represented by  $vbv\_bits$ , a size of said VBV buffer is represented by  $vbv\_bs$ , a bit rate read by said step (d) is represented by  $R$ , and a rate of a unit image to be coded  
20 is represented by  $F$ .

17. The coding method according to claim 16, wherein

said bit rate  $R$  at which a code stored at said step (d) is read is variable.

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18. The coding method according to claim 11, wherein

said step (c) serves to insert a stuffing into a video packet until a first relationship is not satisfied, when a present code volume of a unit image including a last coded macroblock constituting said unit image is smaller than said minimum code volume  $T_{min}$  of said unit image and a number  $M$  of macroblocks to be coded  
5 subsequently to said last coded macroblock, a predetermined length  $VPlen$  of said video packet, said minimum code volume  $T_{min}$  and a present code volume  $Sc$  have a first relationship:  $M \cdot VPlen < T_{min} - Sc$ ,

said code volume controlling step serves to constitute a video packet next to said video packet by a macroblock next to said last coded macroblock without inserting a  
10 stuffing into said video packet, when said first relationship is not established and said number  $M$  of macroblocks, said length  $VPlen$  of a video packet, said minimum code volume  $T_{min}$  and said present code volume  $Sc$  have a second relationship:  $(M - 1) \cdot VPlen < T_{min} - Sc$ .